

Notice of Allowability

Application No.

09/838,219

Examiner

John R. Sanders

Applicant(s)

TAKAGI ET AL.

Art Unit

3737

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the RCE filed 18 June 2004 and the Preliminary Amendment filed 13 April 2005.
2. ☒ The allowed claim(s) is/are 14-34,36 and 37.
3. ☒ The drawings filed on 20 April 2001 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 6/18/04, 4/13/05
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

REASONS FOR ALLOWANCE

1. The following is an examiner's statement of reasons for allowance:
2. The instant application sets forth an image observation apparatus for displaying a plurality of parallax images to a single eye of an observer. The image observation apparatus comprises an image display means that forms the plurality of parallax images that are then guided by a display optical system to a plurality of respective exit pupil regions of said display optical system. Each parallax image is projected to a separate region of the exit pupil, said exit pupil being substantially aligned with the entrance pupil of the eye to cause a plurality of parallax images to be incident on the single eye of the observer.
3. The closest prior art is exhibited by U.S. Patent No. 5,714,967 to Okamura et al ("Okamura") and U.S. Patent No. 6,229,561 to Son et al ("Son"), which do not expressly disclose or render obvious all the limitations of the independent claims.
4. Okamura discloses an image display apparatus designed to alter the position of a light source in order to change the incident position of the projected image. The apparatus (fig. 4) comprises an LCD (42) that is illuminated by backlight (43) to project an image of the LCD to the retina of the eye (44). If the image rays are detected as not being coincident with the pupil, motors are driven to alter the position of the LCD, backlight, and a lens (45) to cause the image to pass through the pupil. Other embodiments (see fig. 15) include a light source (73) comprised of a plurality of point light sources such that the position of the incident rays on the eye can be altered by changing which point light source is illuminated. Okamura is thus enabled to project images from a plurality of regions of the exit pupil of the display optical system to the single eye of the observer; however, the images being projected do not constitute *parallax* images.

Art Unit: 3737

5. By definition, parallax images of an object contain an apparent displacement or difference in apparent direction of the object as seen from two different points not on a straight line with the object. In Okamura, the light from each region is merely the same projected image from the LCD, not offset parallax images. Furthermore, the switching of light from one region to another is done in response to a detection of misalignment between the incident rays and the pupil, not for projecting multiple parallax images to the single eye.

6. In contrast, the instant invention projects a plurality of parallax images (21a, 21b and 21c) to a plurality of regions (11a', 11b' and 11c') on the pupil of the eye, respectfully (see figs. 21-24). See also page 46, line 7 - page 47, line 6.

7. The patent to Son discloses a three-dimensional image system for displaying parallax images to a viewer such that the viewer perceives a stereoscopic image. The image projector system comprises (fig. 1A) a display (15) for displaying the multi-channel image signals, a projection lens (10) and an electro-optic switch (13-1) that spatially divides the exit pupil of the projection system into a plurality of vertical zones. After reflection from a holographic screen (4), a number of view areas (5) are realized wherein an observer might view the images. Each view area is divided into sub-view zones by the electro-optic switch such that when the viewer's eyes are located in different sub-view zones each presenting one of the respective parallax image channels, the viewer sees a three-dimensional image.

8. Son differs from the instant invention in several respects such that the image means and exit pupil dividing means of both Son and the instant invention cannot be considered equivalents. Firstly, whereas Son projects image information from a display (15) which is then divided spatially by an electro-optic switch (13-1), the instant invention provides a exit pupil dividing

Art Unit: 3737

means (11) which projects light through an image display means (20), whereby the image information is imparted to the region of the exit pupil and propagated toward the eye.

9. Secondly, Son is directed to an apparatus for projecting respective parallax images to *each eye* of the viewer. Holographic screen (4) creates view zones (5) wherein sub-view zones (7) are created such that each eye is located in a sub-view zone projecting the respective parallax images. The instant invention does not disclose a holographic screen. Also, Son can be considered to teach away from presenting parallax images to the *single eye* of the observer: "The width of the sub-view zones 7 should be not more than the distance between our eyes, and *not less than the pupil size* of a human eye in order to acquire smooth three-dimensional images" (col. 5, lines 11-15, emphasis added). In other words, the width of the sub-view zones is

10. Thus, the image display means of Son cannot be considered the equivalent of the image display means of the instant invention, at least because (a) the means disclosed by Son is not capable of performing the identical function of the instant means in substantially the same way and producing substantially the same result, (b) the means of the instant invention could not be interchanged with that of the means disclosed by Son, (c) there are substantial differences in construction and mode between the two, and (d) the two means are not structural equivalents.

See MPEP 2183.

11. The prior art of record does not anticipate or render obvious the limitations of an image observation apparatus, constructed to substantially align a position of the exit pupil of a display optical system with the entrance pupil of the eye, having means for spatially dividing said exit pupil into a plurality of regions wherein an image display means is provided for displaying a plurality of parallax images corresponding to the respective regions, said parallax images being

Art Unit: 3737

incident on the single eye of the observer, wherein an area of a region in the outermost periphery of said regions is greater than the regions except for those in the outer periphery.

12. The prior art also does not anticipate or render obvious the limitations of an image observation apparatus, constructed to substantially align a position of the exit pupil of a display optical system with the entrance pupil of the eye, having means for spatially dividing said exit pupil into a plurality of regions wherein an image display means is provided for displaying a plurality of parallax images corresponding to the respective regions, said parallax images being incident on the single eye of the observer, said apparatus comprising control means to change a position of the beam from the image display means at the entrance pupil of the eye to cause plural parallax images corresponding to respective regions of the exit pupil to be incident on the single eye of the observer.

13. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

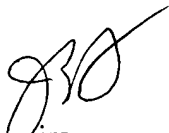
Any inquiry concerning this communication or earlier communications from the examiner should be directed to John R. Sanders whose telephone number is (571) 272-4742.


The examiner can normally be reached on M-F 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian L. Casler can be reached on (571) 272-4956. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 3737

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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